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Sexually transmitted infections among young men who have sex with men: Experiences with diagnosis, treatment, and reinfection

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Abstract

Despite high rates of sexually transmitted infections (STIs) among young men who have sex with men (YMSM), little is known about their experiences with diagnosis, treatment, and reinfection. To fill this gap, we interviewed 17 YMSM ages 18-29 who participated in an online HIV prevention trial and tested positive for STIs at both the baseline and three-month follow-up assessments. Participants were asked about their reactions to testing positive, experiences with treatment, disclosure to partners, and changes in thinking and behavior. Reactions were diverse, the most common being surprise and concern. Most participants sought treatment, although type of provider varied (e.g., primary care physician, clinic that specialized in gay/bisexual men's health). Providers tended to re-test participants, but some did so at the incorrect anatomical site. Participants who felt comfortable talking to providers about STIs tended to use their regular provider or one who specialized in gay/bisexual men's health. Most participants described changes in their thinking and behavior (e.g., increased condom use, decreased sex partners, questioning

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their partners' trust). Most participants disclosed to at least one partner, but some did not remember or were not in contact with partners. Experiences were similar the first and second time participants tested positive for STIs during the study with a few exceptions (e.g., more self-blame and comfort talking to providers the second time). In sum, YMSM have diverse experiences with STI diagnosis and treatment. Implications for public policy and STI prevention are discussed.

Keywords

young men who have sex with men; sexually transmitted infection; diagnosis; treatment; reinfection

Gay, bisexual, and other men who have sex with men (MSM) are at increased risk for sexually transmitted infections (STIs) compared to heterosexual men (Brewer et al., 2011; CDC, 2008; Kirkcaldy et al., 2013; Su, Beltrami, Zaidi, & Weinstock, 2011) and high rates of STIs, especially rectal STIs (Kelley et al., 2015; Kent, 2005; Mustanski, Feinstein, Madkins, Sullivan, & Swann, 2017), have been documented among MSM. For example, in a sample of HIV-negative MSM from STI clinics across six jurisdictions in the United States (US; Baltimore, Los Angeles, New York City, Philadelphia, San Francisco, and Seattle), 5.7% tested positive for urethral chlamydia, 8.6% for urethral gonorrhea, 7.5% for rectal chlamydia, and 5.5% for rectal gonorrhea (CDC, 2015). Although prevalence was lower in a national US sample of mostly adult HIV-negative MSM (1.4% urethral chlamydia, 0.5% urethral gonorrhea, 4.4% rectal chlamydia, 1.8% rectal gonorrhea; Grov, Cain, Rendina, Ventuneac, & Parsons, 2016), prevalence of rectal STIs was high in a large national US sample of young MSM (YMSM; 8.8% rectal chlamydia, 5.0% rectal gonorrhea; Mustanski, Feinstein, et al., 2017). The CDC recommends that sexually active MSM get tested for STIs at least once a year and more frequently (e.g., 2-4 times a year) for those who have multiple or anonymous partners (CDC, 2017a). However, the prevalence of STI testing among MSM remains low, especially for rectal STIs and among YMSM. In a sample of HIV-positive MSM across six US cities, annual screening rates for STIs were 13.8-18.3% for urethral STIs and 2.3-8.5% for rectal STIs (Hoover et al., 2010). Further, in a sample of YMSM, only 57.6% had ever been tested for chlamydia, gonorrhea, or syphilis (Meanley, Gale, Harmell, Jadwin-Cakmak, Pingel, & Bauermeister, 2015). Given that YMSM have the highest rate of new HIV infections (CDC, 2016a) and that rectal STIs are associated with increased HIV transmission (Barbee, Khosropour, Dombrowski, & Golden, 2017; Bernstein, Marcus, Nieri, Philip, & Klausner, 2010; Kelley et al., 2015), there is a need to understand factors that contribute to STI transmission among YMSM. Several risk factors for STIs among MSM have been identified (e.g., younger age, non-White race/ethnicity, inconsistent condom use, receptive condomless anal sex [CAS], more sex partners) (Chow, 2015; Grov et al., 2016; Kelley et al., 2015; Mustanski, Feinstein, et al., 2017), but little is known about the experiences of YMSM with STI diagnosis and treatment. This represents a gap in our understanding of risk for STIs among YMSM and a more comprehensive understanding of these experiences can inform interventions to increase STI testing and treatment in this high-risk population.

Most previous research on the experiences of MSM with STI diagnosis and treatment has focused on HIV/STI testing (e.g., motivations for testing, barriers to testing) and changes in sexual behavior subsequent to being diagnosed with HIV. For example, qualitative research has identified diverse motivations for HIV/STI testing among MSM, including event-driven reasons (e.g., experiencing symptoms, engaging in CAS, finding out a partner was infected), prevention-driven reasons (e.g., routine healthcare), and socially-driven reasons (e.g., entering a new relationship, being encouraged by a friend or family member; Mimiaga, 2007). Further, MSM who had never been tested for STIs other than HIV described various reasons for not seeking broader STI testing, such as not experiencing symptoms, not perceiving oneself as being at risk, and lack of access to free or anonymous services (Mimiaga, 2007). The majority of MSM who had engaged in CAS also reported that their providers did not recommend HIV/STI testing (Mimiaga, 2007), highlighting the role of providers in whether or not MSM get tested for HIV/STIs.

In regard to diagnosis, previous research has demonstrated that being diagnosed with HIV is associated with changes in sexual risk behavior, such as decreases in CAS (Marks, Crepaz, Senterfitt, & Janssen, 2005; Rosenberg et al., 2013; Turner et al., 2009; Weinhardt, Carey, Johnson, & Bickham, 1999) and number of sex partners (Muller, Sarangbin, Ruxrungtham, Sittitrai, & Phanuphak, 1995). However, to our knowledge, no previous studies have examined changes in sexual behavior subsequent to being diagnosed with urethral or rectal STIs (e.g., chlamydia, gonorrhea). Further, all of the aforementioned studies on behavioral responses to being diagnosed with HIV were quantitative. While these studies provide valuable information on how being diagnosed with HIV can influence sexual behavior, qualitative studies have the potential to provide rich data on the experiences of YMSM with STI diagnosis, such as their emotional reactions to being diagnosed with an STI and how being diagnosed with an STI influences their thinking and behavior. In turn, this information can inform interventions to increase STI testing and treatment among YMSM.

Finally, while little is known about the experiences of YMSM with STI diagnosis and treatment, even less is known about their experiences with STI reinfection. A review of studies on STI reinfection among men in general (i.e., not MSM in particular) found that the prevalence of repeated chlamydia infection ranged from 9.8% to 18.3% across studies (median = 11.3%) and the prevalence of repeated gonorrhea infection ranged from 0% to 30.8% across studies (median = 7.0%; Fung, 2007). Of note, the time period in which STI reinfection occurred varied across studies, ranging from 10-24 weeks (median = 4 weeks) for studies with active follow-up (i.e., prospective cohort studies) to as long as 4.8 years for studies with passive follow-up (i.e., disease or clinic registries; Fung, 2007). Although studies with passive follow-up had higher proportions of STI reinfection, it remained high in studies with active follow-up (median = 10.9% and 7.0% for repeated chlamydia and gonorrhea, respectively). Further, STI reinfection was associated with younger age and non-White race/ethnicity, and there was some, although inconsistent, evidence that STI reinfection was also associated with not using condoms and having more sex partners. Therefore, despite effective treatments for chlamydia and gonorrhea (Workowski et al., 2015), STI reinfection is common. Still, given the lack of previous research on the experiences of YMSM with STI diagnosis and treatment, the factors that contribute to STI reinfection among YMSM remain unclear.

To address these gaps, we conducted qualitative interviews with 17 YMSM ages 18-29 who participated in an online HIV prevention trial and tested positive for an STI (urethral or rectal chlamydia or gonorrhea) at both the baseline and three-month follow-up assessments. The interviews focused on their emotional reactions to testing positive for an STI, their experiences with treatment, disclosure to partners, and the extent to which testing positive for an STI influenced their thinking and behavior. Participants were interviewed about their experiences testing positive for an STI at both the baseline and three-month follow-up assessments in order to understand potential differences between experiences with initial versus repeated or untreated STI infections.

Methods

Participants and Procedures

Participants included YMSM ages 18-29 who: (1) participated in a randomized controlled trial (RCT) of an online HIV prevention trial (Keep It Up! 2.0); and (2) tested positive for an STI at both the baseline and three-month follow-up assessments. Detailed information about recruitment and procedures for the trial can be found elsewhere (Mustanski, Madkins, et al., 2017). In brief, recruitment occurred in-person and online in three US cities (Atlanta, Chicago, and New York City) and via a national social media campaign. Participants were required to be 18-29 years old, cisgender men (i.e., assigned male at birth and identified as male), HIV-negative (confirmed via in-person or at-home testing), able to read English at an 8th grade level, to report CAS with a man in the past six months, to not be in a monogamous relationship for longer than six months, and to have email.

Participants completed questionnaires at baseline and 3-, 6-, and 12-month follow-up, and were tested for urethral and rectal chlamydia and gonorrhea at baseline and 12-month follow-up. All participants who consented to the study beginning in December 2013 and tested positive for an STI at baseline were also retested for STIs at the 3-month follow-up. STI testing could be completed in-person or at-home. Participants who completed testing at-home were mailed test kits with instructions for collecting and returning samples. Samples were self-collected using Aptima Urine and Unisex Swab Specimen Collection Kit and tested for chlamydia and gonorrhea by the CDC Division of STD Prevention Laboratory using the Aptima Combo 2 CT/NG Assay (Hologic, Inc., 2016). Specimens were analyzed on the Aptima Panther automated platform system, which has a sensitivity of 94.4-98.7% and specificity of 99.7-99.8% when male urine is tested for chlamydia and gonorrhea (Hologic, Inc., 2016). A validation study by the laboratory indicated >95% sensitivity and >99% specificity for rectal swabs, which is similar to other validations studies (Bachmann et al., 2010; Cosentino et al., 2012). Participants were provided with test results via phone and/or encrypted and password-protected email. Those who tested positive were provided with local referrals for free or low-cost treatment along with a document describing their positive test result in the context of a confidential research study that could be given to their healthcare provider. Positive test results were also reported to local health departments by research staff. All procedures were approved by the affiliated Institutional Review Boards.

In order to participate in the qualitative interviews, participants were required to test positive for an STI at both the baseline and 3-month follow-up assessments and to consent to their

interview being audio-recorded. Participants were required to test positive for an STI at both assessments because we were interested in understanding experiences with repeated or untreated STIs. Interviews were conducted after the completion of all RCT activities, including the 12-month follow-up assessment. Two trained team members conducted the interviews via phone, which lasted 20-30 minutes each, and participants were compensated with \$10 Visa gift cards. De-identified interviews were transcribed and imported into Dedoose Version 7.6.17 (2017) for data analysis.

A total of 901 YMSM participated in the RCT and 29 were eligible for the qualitative interview (i.e., tested positive for an STI at both the baseline and three-month follow-up assessments) and invited to participate. Of the 29 eligible participants, 19 (65%) consented to participate. Those 19 participants were interviewed, but two of them were excluded from the analytic sample. One participant was excluded because he did not remember testing positive for an STI at either assessment and, as such, he was unable to answer the interview questions. The other participant was excluded because he believed his test results were false positives at both assessments. His initial reaction to testing positive for an STI was “confusion,” and he sought independent STI testing, which he reported was negative. Therefore, he was also unable to answer the other interview questions. After excluding these two participants, the analytic sample included 17 YMSM. Demographic characteristics of the analytic sample are reported in Table 1.

Measures

Demographics—As part of the baseline assessment, participants were asked to report their age, race/ethnicity, sexual orientation, highest level of education completed, relationship status, and city of residence. Response options and descriptive statistics are reported in Table 1.

Semi-structured interview—The research team developed the semi-structured interview to assess experiences related to STI diagnosis, treatment, and reinfection. The interview included open- and close-ended questions with probes for additional information. Questions focused on: (1) emotional reactions to testing positive for an STI; (2) experiences with treatment (e.g., whether or not participants sought treatment, whether or not providers retested participants for STIs, provider reactions to STI disclosure); (3) disclosure to sex partners; (4) the extent to which testing positive for an STI influenced how participants thought about sexual risk/protection and their behavior; and (5) the extent to which their experiences testing positive for an STI the second time (i.e., at the three-month follow-up assessment) were different from their experiences the first time (i.e., at the baseline assessment).

Coding and data analysis

Transcripts were coded using deductive and inductive methods to examine patterns of interest while also allowing themes to emerge throughout the analysis. We began with a preliminary codebook, which included broad preliminary codes, descriptions of codes, and example quotes (MacQueen, McLellan, Kay, & Milstein, 1998). The preliminary codes were based on a priori domains set by the interview guide. As individual transcripts were coded,

we expanded the codebook to include additional themes that were not apparent from the interview guide. Emerging themes were developed based on the first several transcripts and refined using the constant comparison method (Taylor & Bogdan, 1998). Coder memos were also used to identify emerging themes as well as overlapping themes that could be collapsed. As noted, some questions were close-ended (e.g., “Did you seek treatment after you got the test result?”) In these instances, codes were straightforward (yes or no responses to content areas), but participant quotes provided detailed explanations and context. Codes and subcodes (representing themes and examples of themes, respectively) were applied to excerpts throughout each transcript. The first two authors coded all of the transcripts and achieved a kappa score of .89, indicating strong reliability (McHugh, 2012). Participant quotes are presented verbatim with the exception of minor edits to spelling and grammar to facilitate readability.

Results

Types of STIs

Of the 17 men, 10 (58.8%) had rectal chlamydia at both assessments, five (29.4%) had rectal gonorrhea at both assessments, and two (11.8%) had urethral chlamydia at both assessments. Of the five men who had rectal gonorrhea at both assessments, one also had rectal chlamydia at baseline and one also had rectal chlamydia at follow-up (i.e., rectal gonorrhea and chlamydia co-infection). Of the two men who had urethral chlamydia at both assessments, one also had rectal gonorrhea at baseline and rectal chlamydia at follow-up (i.e., urethral chlamydia and rectal gonorrhea or chlamydia co-infection). In sum, three men (17.6%) had gonorrhea and chlamydia co-infection at baseline or follow-up. During the interviews, participants were asked if they were experiencing any symptoms when they were first diagnosed with an STI at the baseline assessment and most ($n = 14/16$, 87.5%) reported being asymptomatic.

Reactions to being diagnosed with an STI

Counts and percentages for endorsement of each code and subcode are presented in Table 2. Percentages are based on how many participants answered questions relevant to each code. First, we asked participants to reflect on their reactions to the first time they tested positive for an STI during the study. While reactions were diverse, the most common were surprise (76.5%) and concern (29.4%). One man who was surprised explained: “I was surprised because, to my knowledge, I had been safe with condoms...And, you know, how you trust people and think that they're good, but then, it turns out to be something else” (28 years old, multi-racial, bisexual). Another man was surprised because he did not know it was possible to get a rectal STI: “...I didn't even know you could get a rectal STI so I was really kind of surprised and more concerned about how, like, would that even be treated” (21 years old, Black, gay). In addition to surprise, men expressed being worried because they had limited knowledge about STIs or it was their first time being diagnosed with an STI. For example, one man explained: “...I was really nervous because I really didn't know about many STIs....So I was just really shocked. And I just didn't know what to do” (21 years old, Latino, gay). Similarly, another man said: “I'd never dealt with an STI before....It was just the first experience thing” (25 years old, Latino, gay).

Although most concerns focused on the men themselves, some men were concerned about their partners (e.g., one man worried about infecting his partner, one man assumed his partner infected him and worried about how his partner became infected). Additionally, one man expressed self-blame: "...immediately I was disappointed, almost angry with myself for letting me contract an STI" (21 years old, Latino, bisexual). Further, two men were annoyed that they would need to take time to get treatment and one man believed the result was a false positive.

Men described similar reactions when they reflected on the second time they tested positive for an STI during the study. Most men were still surprised (55.6%). Some men thought their initial treatment failed and it was still the original infection. For example, one man explained: "...honestly, I don't know how that happened. Because I had treatment and, before that, I did not have sex with anyone" (25 years old, Latino, gay). Another man who was surprised started to question whether he could trust his partners: "One of the guys I was with was not being honest with me still. And that bothered me because I thought I had trusted them" (23 years old, White, gay). Additionally, two men described being more concerned the second time. For instance, one man explained: "I was worried it was something else greater, since I'd had the treatment before. I was expecting that to work and to be negative. So, in the back of my brain, I was worried it was something worse, that it just triggered the chlamydia positive" (29 years old, White, gay). Similar to the reactions the first time, one man was annoyed that he would need to get treatment again.

Treatment experiences

Most men sought treatment for their infections the first time (81.3%) and the second time (92.9%). Those who did not seek treatment described not having time or misreading the result (thus, not knowing about the STI). For instance, one man explained: "...it was too chaotic at the time. I was moving around too many times and traveling so I really couldn't go right away" (18 years old, Latino, gay). Men used various types of providers, including primary care physicians, clinics that specialized in gay/bisexual men's health, and emergency rooms. When men sought treatment for their infections the first time, most providers retested participants for STIs before providing treatment (69.2%), but two men were tested at the wrong anatomical site (i.e., they presented with rectal STIs, but were retested for urethral STIs). In contrast, most men reported that they were not retested by their provider (70%) the time second they sought treatment. Of those who were retested the second time, one was retested at the wrong anatomical site.

Comfort talking to providers—Reflecting on the first time they sought treatment during the study, similar percentages of men described feeling comfortable (53.8%) and uncomfortable (46.2%) talking to their providers about STIs. Those who felt comfortable tended to use their regular providers or providers who specialized in gay/bisexual men's health. For instance, one man explained: "It was fine, just because I have been going to her for a while and she, like, knows me. So it wasn't as, like, uncomfortable, I guess, talking to her about it" (21 years old, Black, gay). A man who used a provider who specialized in gay/bisexual men's health explained: "I feel pretty comfortable going to [name of clinic] than

going to a normal clinic....They're really open about it, about the STIs..." (21 years old, Latino, bisexual).

Those who felt uncomfortable described being embarrassed. For instance, one man said: "[I felt] kind of embarrassed just because nobody likes to talk about that to somebody they don't know at least" (28 years old, multi-racial, bisexual). Similarly, another man explained: "It was awkward. No one ever wants to admit they have an STI. I don't think I know anybody who would proudly say they've had an STI. Me, I felt awkward. I was very, I don't want to say ashamed, but almost like not proud to say that I have an STI..." (21 years old, Latino, bisexual). Although knowing one's provider tended to make men feel more comfortable, some men still felt uncomfortable with their regular providers. For instance, one man explained: "...even though, you know, that's your doctor, that's still something that's not a comfortable conversation. It's like, you know, you don't tell your doctor your entire sex life" (20 years old, Black, bisexual).

Men described similar levels of comfort talking to providers when they reflected on the second time they sought treatment (55.6% felt comfortable, 44.4% felt uncomfortable). However, the second time, men tended to attribute their comfort to having a better understanding of the process or having developed rapport with their provider. For example, one man explained: "Honestly, the first time is always the worst. I think it just gets easier after that" (21 years old, Latino, gay). Men who felt uncomfortable described being more embarrassed the second time. For instance, one man said: "Well, the doctor asked why I was re-infected, and I felt a little embarrassed that I kind of – well, that it was reckless...And, I knew better...and I still ignored it" (23 years old, White, gay).

Provider reactions—Most men described their provider's reaction the first time as neutral and none described it as negative. One man explained: "She wasn't surprised at all....she seemed fine with it. It wasn't anything judgmental coming out of it. But, I think they probably also see that quite a bit..." (23 years old, White, gay). Similarly, most men described their provider's reaction the second time as neutral (66.7%), while two men (22.2%) described it as positive and one man (11.1%) described it as negative. One of the men who described a positive reaction perceived his provider as going above and beyond what he expected. He explained: "...[the provider] was really helpful. Like, he actually sat down with me and explained to me....he was really helpful" (25 years old, Latino, gay). In contrast, the one man who described a negative reaction explained that the provider had poor bedside manner: "...I feel like I'm rushed and he doesn't really explain anything thoroughly. So, it's just like, "Here, okay. I'll prescribe this," kind of thing. So, it kind of felt a little cold-hearted in conversation" (29 years old, White, gay).

Changes in thinking and behavior

Then, we asked participants if and how being diagnosed with an STI affected their thinking and behavior related to sexual risk and protection. Reflecting on the first time they tested positive for an STI during the study, most men reported that it had an influence on their thinking (86.7%) and behavior (88.2%). These men typically described reducing sexual risk behavior, such as using condoms more consistently and having sex with fewer partners. For

example, one man decided: "...there will be no skin contact period if there's no condoms" (21 years old, Latino, bisexual). Similarly, another man described: "...I cut down on the multitude of partners and, you know, made it to just one personal partner" (20 years old, Black, bisexual). Some men chose monogamy as a way to practice safer sex: "...It made me essentially decide that I should follow what I know to be the safest and best practices, and then also to just be more monogamous I suppose" (23 years old, White, gay). In contrast, others described being in non-monogamous relationships, but making sure to use condoms with casual partners: "...we decided to keep it somewhat open but with rules that, unless we are together, any additional sexual partners, they must have a condom on at all times" (23 years old, White, gay). In addition to changes related to protective behavior, some men reconsidered how honest their partners were being: "...most partners I have or had in the past, I used protection with. And there's only a couple that I knew very well that we didn't use protection, and then it made me reconsider how honest those people were with me. Because, obviously, it had to come from somewhere" (23 years old, White, gay).

Men reported similar changes to thinking and behavior when reflecting on the second time they tested positive for an STI during the study (e.g., needing to be more careful, having sex with fewer partners). Again, most men reported that it changed their thinking (87.5%) and behavior (77.8%). One man described: "...I have a boyfriend, and we're just really open about our relationship. So we used to have threesomes and stuff like that...but we just stopped after having my second time of STIs. And we just stopped having an open relationship" (21 years old, Latino, bisexual). Similarly, after explaining that he realized one of his partners was not being honest, one man said: "...I just stopped seeing one of them, and the other one we're using protection. And I stopped being a bottom for that other partner" (23 years old, White, gay). One man who blamed himself for not taking precautions the second time said: "It's like looking yourself in the mirror and talking to yourself, saying, 'Are you kidding me? Why did you put yourself through this again?...There are clear precautions...'" (21 years old, Latino, gay). In a follow-up question, he was asked if he thought about using condoms after the first time he tested positive for an STI during the study. He said: "Absolutely. I don't think that changed though because, as a 21 year old something, completely uneducated, and not intelligent in my moves, I don't think I did anything about it."

Only two men reported that being diagnosed with an STI did not change their thinking or behavior either time. One of these men explained that it did not change his thinking because: "...I perceived it as something treatable..." (25 years old, Asian, gay), while the other described: "... to be honest, I don't think my behavior really changed that much because, like I said, I feel like I'm very aware of who I sleep with and it's not just anyone" (23 years old, Asian, gay).

Disclosure to sex partners

Most men reported that they had disclosed their positive STI test results to at least one recent sex partner the first time (73.3%) and the second time (83.3%). Several said their partners were surprised and claimed that they did not have an STI. For example, one man said: "I did talk to them. And everyone said that it wasn't them or that they also got tested and they're

clean...” (23 years old, White, gay). There were varied reasons for non-disclosure, such as not remembering partners and not being in contact with partners. One man described not telling his partner because he felt betrayed: “...at that moment I had felt betrayed....If I give somebody my body like that, I would just think that you have enough respect for me and you” (21 years old, Black, gay). Additionally, one man did not tell his partner because he was not having symptoms and did not believe he had an STI.

Future STI testing

Given that most participants had rectal STIs, they were asked if they planned to get tested for rectal STIs in the future. All of the 15 men who were asked this question said yes. Two men explained that they only knew about urethral STIs prior to participating in this study. Some men also expressed concerns about the cost of STI testing and being uninsured. For example, one man explained: “I just have an issue with the facility and making it available....I had an issue with [name of clinic] because I was in a tough financial situation and I wasn't insured, so they had treatment but they wouldn't allow me to get treated unless I got tested. So, that's a major hit that I wasn't prepared for financially” (29 years old, Latino, gay). Due to a shortage of time for the interview, two men were not asked this question, but one of those two men spontaneously mentioned in his interview that he regularly tested for rectal STI tests.

Discussion

In a unique sample of YMSM with two STI diagnoses in a three-month period, our findings offer important insights into the experiences of YMSM with STI diagnosis, treatment, and reinfection. First, most of the men in our sample did not experience any symptoms. This is consistent with previous findings that STIs, especially rectal STIs, are often asymptomatic (Peters, 2011; Workowski et al., 2015), but it is also possible that YMSM are not familiar with STI symptoms. Second, reactions to testing positive for an STI were diverse, but most men were surprised or worried. Of concern, two men did not know it was possible to get a rectal STI and others described having limited knowledge about STIs. These findings highlight the need for YMSM to be educated about STIs, including information about rectal STIs. Two men also expressed being annoyed about the inconvenience of needing to get treatment. Although this is a valid frustration, it is important for YMSM to understand the potential health consequences of untreated STIs. Given evidence of the feasibility and acceptability of home-based STI testing and treatment (Blake et al., 2015), future research could explore options to expedite treatment in the context of an eHealth study for YMSM.

Reflecting on the second time they tested positive for an STI during the study, some men thought their initial treatment failed and that it was still the original infection. This is possible, but it is also possible that some men continued to have sex with infected partners, putting them at risk for reinfection. Given that frontline treatment for chlamydia and gonorrhea is highly effective (Workowski et al., 2015) and that most participants reported obtaining treatment, it is likely that the majority of infections at follow-up represented new infections. In cases where men continued to have sex with infected partners, expedited partner therapy (EPT; e.g., patient-delivered partner therapy) has the potential to reduce

reinfection. In EPT, the partner of a patient diagnosed with chlamydia or gonorrhea is treated by providing the patient with a prescription or medication to give to their partner without the provider first examining the partner (CDC, 2017b). This can be useful when traditional partner management strategies (e.g., patients, providers, or public health agencies notifying partners and encouraging them to seek in-person evaluation and treatment) are not possible or not successful (CDC, 2006). EPT has been found to reduce chlamydia and gonorrhea reinfection among heterosexual adults (CDC, 2006), but its efficacy among MSM remains unknown and it is not routinely recommended for this population because of a high risk of co-occurring infections (e.g., HIV; CDC, 2016b). Further, laws and policies related to EPT vary by state. At present, EPT is permissible in 41 states, potentially allowable in seven states, and prohibited in two states (CDC, 2017b). Therefore, it will be important for future research to test the efficacy of EPT as a way to reduce STI reinfection among MSM, including YMSM.

We found that most men sought treatment for their STIs both times. This is encouraging and it suggests that testing can be an effective introduction to treatment as well as an opportunity to provide education about STIs. Men used various types of providers, including primary care physicians, clinics that specialized in gay/bisexual men's health, and emergency rooms. Of concern, several men reported that providers retested them for STIs at the wrong anatomical site (e.g., they presented with rectal STIs, but were retested for urethral STIs). Given that rectal STIs are common among MSM (Kelley et al., 2015; Kent, 2005; Mustanski, Feinstein, et al., 2017) and that testing for rectal STIs is low among MSM (Hoover et al., 2010), there is a critical need to increase testing for rectal STIs in this population. It is important for all providers—not just those who specialize in gay/bisexual men's health—to receive training in STI testing/treatment and to include rectal STI testing in comprehensive STI testing. Based on our findings, providers should be encouraged to offer comprehensive STI testing that includes rectal testing, take the time to discuss risk reduction strategies with patients (and how to follow through on behavior change plans), and help patients tell their partners about their STI test results. Incorporating formal training on these topics into medical school curricula has the potential to increase the extent to which the next generation of providers is competent in providing comprehensive sexual healthcare. Public health detailing and continuing education could help train established providers. For example, the CDC offers web-based training, including continuing education credits, for clinicians who provide care for STI patients (CDC, 2014). Although some of these training activities mention that MSM are at increased risk for STIs, providers may need additional content focused on comprehensive HIV/STI testing and treatment for MSM.

We found considerable variability in men's comfort talking to providers about STIs. Those who were comfortable tended to use their regular doctors or providers who specialized in gay/bisexual men's health. Reflecting on the second time they sought treatment, men tended to attribute their comfort to having a better understanding of the process or having developed rapport with their provider during their first visit. These findings highlight the benefits of having an established relationship with a regular healthcare provider, especially one who specializes in gay/bisexual men's health. Further, YMSM may feel more comfortable talking to providers about STIs if they receive education about STI testing and treatment procedures, which could be included in sexual health education and HIV/STI prevention

programs. In contrast, those who were uncomfortable described being embarrassed or ashamed because they had an STI, especially the second time they sought treatment during the study. Although their discomfort did not stop them from seeking treatment, it is possible that they were less open about their sexual behavior with their providers and less likely to ask questions related to their sexual health due to their discomfort. Although most men described their provider's reaction to their disclosure as neutral, a few described positive experiences in which providers spent time talking to them about how to prevent STIs in the future. Therefore, providers may be able to have a greater impact on YMSM by devoting time to discussing sexual health in a non-judgmental manner.

In our sample of YMSM with two STI diagnoses in a three-month period, most reported that testing positive for an STI influenced their thinking and behavior related to sexual risk and protection. Specifically, they described reducing sexual risk behavior and using protective strategies more consistently (e.g., using condoms, having sex with fewer partners, discussing STIs with partners). These findings are consistent with previous findings that being diagnosed with HIV is associated with decreases in CAS (Marks et al., 2005; Rosenberg et al., 2013; Turner et al., 2009; Weinhardt et al., 1999) and number of sex partners (Muller et al., 1995). Therefore, it is possible that being diagnosed with an STI, including HIV as well as chlamydia and gonorrhea, contributes to engagement in safer sexual behavior. Still, it is important to note that all of these men had STIs at the baseline and three-month follow-up assessments. For some of these men, changes in their thinking may not have translated into behavioral changes. These men may need education about additional strategies to protect against STIs and behavioral skills to follow through on change plans. Of note, one man reported that testing positive for an STI did not change his thinking about sexual risk/protection, because he perceived it as treatable. This suggests that some men might need education about the risks of STIs (e.g., increased risk for HIV infection) even if the STI can be treated. For example, given that STIs are often asymptomatic, it is possible to have an STI and not know about it, and the untreated STIs can have broader health consequences (Berger et al., 1979; Carter & Inman, 2011; Holmes, Counts, & Beaty, 1971; Workowski et al., 2015) as well as continued transmission to other partners. Although most men disclosed their positive STI test results to at least one partner, a sizeable proportion did not. In order to prevent forward transmission, YMSM should be encouraged to disclose STIs to recent partners.

Findings should be considered in light of limitations. First, data were from 17 YMSM, all of whom were HIV-negative and participated in an online HIV prevention trial, and most of whom identified as gay. Although the sample was racially/ethnically diverse, it will be important for future research to continue to examine the experiences of YMSM with STI testing and treatment in larger, more diverse samples. Further, most of our participants lived in urban locations, and it is likely that access to affirming healthcare for gay/bisexual men (including STI testing and treatment) differs across urban, suburban, and rural locations. As such, research is needed to understand the extent to which reactions to being diagnosed with an STI and treatment experiences (e.g., comfort talking to providers) differ based on location. Second, interviews focused on experiences related to testing positive for STIs at the baseline and three-month follow-up assessments, but the interviews were conducted after participants completed 12-month follow-up assessments. Therefore, participant recollection

of details related to their experiences may have been biased. In sum, the current findings provide valuable information about the experiences of YMSM with STI testing/treatment and can be used to inform interventions to increase STI testing/treatment in this high-risk population.

Limitations aside, the current findings have important implications for public policy and HIV/STI prevention for YMSM. The prevention of HIV among YMSM remains a major public health concern. Given that MSM are also disproportionately affected by other STIs (Brewer et al., 2011; CDC, 2008; Kirkcaldy et al., 2013; Su et al., 2011), and that rectal STIs are associated with increased HIV transmission (Barbee et al., 2017; Bernstein et al., 2010; Kelley et al., 2015), there is a clear need for continued HIV/STI prevention in this population. The fact that most YMSM in our study sought treatment for their STIs is encouraging and suggests that testing can lead to treatment for YMSM. From a public health perspective, increased STI testing and treatment among YMSM has the potential to identify new infections early, prevent forward transmission, and prevent the development of additional negative health outcomes related to untreated STIs.

There are several possible ways to increase STI testing and treatment among YMSM, including comprehensive sexual health education, post-STI test counseling, and expedited partner therapy. Most school-based sexual health education programs do not address the needs of sexual minority youth (Kubicek, Beyer, Weiss, Iverson, & Kipke, 2010; Santelli et al., 2006), highlighting the need for reform. Our findings suggest that sexual health education and HIV/STI prevention programs should include education about rectal STIs, potential symptoms (and that many infections are asymptomatic), potential health consequences of untreated infections, and the process of getting testing and treated for an STI. Additionally, given that many of the YMSM in our sample reported being uncomfortable talking about STIs with their providers, education programs should normalize patient-provider communication about sexual health and teach skills for requesting comprehensive HIV/STI testing even if providers do not recommend these services. In some cases, disclosing an STI diagnosis to a partner can lead to threats of harm or actual harm (Decker et al., 2011). Therefore, programs should also address strategies for safely disclosing STI diagnoses to partners (e.g., bringing one's partner into the clinic if acute safety is a concern).

Post-STI test counseling has the potential to serve as another source of sexual health education and HIV/STI prevention for YMSM. Risk-reduction counseling is often paired with HIV testing as a prevention strategy. In 2006, the CDC removed the requirement for risk-reduction counseling as part of HIV screening programs in healthcare settings (Branson et al., 2006). However, a randomized controlled trial found that risk-reduction counseling paired with rapid HIV testing significantly reduced the number of condomless sex partners among the subset of MSM in the sample, although it was not associated with STI reduction (Metsch et al., 2013). Other studies have also demonstrated that risk-reduction counseling can reduce sexual risk behavior among MSM (Dilley et al., 2002; Dilley et al., 2007). Therefore, combining risk-reduction counseling with STI testing in general (not just HIV testing) has the potential to reduce sexual risk behavior as well. Finally, as discussed, expedited partner therapy (e.g., patient-delivered partner therapy) also has the potential to

reduce reinfection among YMSM and their partners, although there is a need for research on using this approach with YMSM (CDC, 2016b).

In sum, there are multiple potential strategies to increase STI testing and treatment among YMSM. Policy makers can play a key role in reforming sexual health education and HIV/STI prevention by enacting laws and allocating funding aimed at improving healthcare in these domains. Further, policy makers are also encouraged to fund additional research to develop and disseminate evidence-based interventions to increase STI education, testing, and treatment among YMSM, especially those who are most underserved (e.g., Black and Latino YMSM). Future research on integrating STI education, testing, and treatment into eHealth prevention and intervention programs has the potential to reach large numbers of YMSM, including those who do not have access to healthcare and those who do not utilize healthcare for STI testing and treatment because of embarrassment.

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Table 1

Demographic characteristics.

Demographic characteristic	Mean (SD) or N (%)
Age	24.06 (3.38)
Race/ethnicity	
White	3 (17.6%)
Black	5 (29.4%)
Hispanic/Latino	6 (35.3%)
Other	3 (17.6%)
Sexual orientation	
Gay	14 (82.4%)
Bisexual	3 (17.6%)
Highest level of education completed	
Partial high school	1 (5.9%)
Partial college	10 (58.8%)
College	4 (23.5%)
Graduate degree	2 (11.8%)
Relationship status	
Serious relationship	4 (23.5%)
Casually dating	3 (17.6%)
Fuck buddy or booty call	4 (23.5%)
One-night stand or sex with stranger/anonymous person	6 (35.3%)
City of residence	
Atlanta	3 (17.6%)
Chicago	7 (41.2%)
New York City	4 (23.5%)
Other	3 (17.6%)

Notes. All demographic data were reported at the baseline assessment; most participants lived in the three main recruitment cities (Atlanta, Chicago, and New York City), but three participants lived in cities in California and Maryland.

Table 2

Counts and percentages for code endorsement.

Code	Subcode	Baseline		Follow-Up	
		N	Count %	N	Count %
Reaction to testing positive for an STI	—	17	—	9	—
	Surprised		13 76.5	5	55.6
	Concerned		5 29.4	2	22.2
	Annoyed		2 11.8	1	11.1
	Self-blame		1 5.9	0	0
Sought treatment	Did not believe result		1 5.9	1	11.1
	—	16	—	14	—
	Yes		13 81.3	13	92.9
	No		3 18.8	1	7.1
	—	13	—	10	—
Provider re-tested	Yes, correct anatomical site		7 53.9	2	20.0
	Yes, inaccurate anatomical site		2 15.4	1	10.0
	No		4 30.8	7	60.0
	—	11	—	9	—
	Neutral		10 90.9	6	66.7
Provider reaction	Positive		1 9.1	2	22.2
	Negative		0 0	1	11.1
	—	13	—	9	—
	Comfortable		7 53.8	4	44.4
	Uncomfortable		6 46.2	5	55.6
Comfort talking to provider	—	17	—	8	—
	Yes		15 88.2	7	87.5
	No		2 11.8	1	12.5
	—	15	—	9	—
	Yes		13 86.7	7	77.8
Changed thinking	No		2 13.3	2	22.2
	—	15	—	6	—
	Yes		13 86.7	7	77.8
	No		2 13.3	2	22.2
	—	15	—	6	—

Code	Subcode	Baseline		Follow-Up	
		N	%	N	%
	Yes	11	73.3	5	83.3
	No	4	26.7	1	16.7

Notes. Percentages are based on how many participants answered questions relevant to each code (indicated in the columns labeled *N* in the first row for each code).